HECTOR, A NEW MULTIFUNCTIONAL MICRO-CT SCANNER AT UGCT

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ABSTRACT

BACKGROUND

UGCT is a user facility for lab-based X-ray microtomography research at the Ghent University. This paper will present the possibilities of a newly developed scanner, HECTOR.
HECTOR stands for High Energy CT Optimized for Research. It was developed mainly to complement the range of applications which can be covered by the already existing scanners at UGCT. Those include a 400 nm resolution system and a 5µm resolution gantry based system, but are all limited to 130 or 160 kV. HECTOR is built around a 240 kV microfocus source with a maximum power of 280 W and a minimal focal spot size of 4 µm, and combined with a large 2D flat panel detector.

METHOD

The first aim of HECTOR was to extend the application range towards larger and more absorbing samples such as geological drill cores, concrete, metallic samples etc. To cover large samples the flat panel detector can be tiled on an XY stage, resulting in a detector area of 80 x 80 cm. The spectrum can be tuned to significantly higher energies than at the other scanners through beam filtration, while still yielding sufficient flux thanks to the high power beam. A line detector will be installed in the near future which will even further increase the detected average energy.

RESULTS

The high power beam also makes it possible to perform high speed CT scanning of dynamic processes. This allows monitoring of processes like foam collapse, water ingress etc. in 3D. Examples will be given to illustrate the possibilities and particularities that come with this type of scanning.
Finally, HECTOR was designed to provide a high degree of flexibility for CT research. This includes support for helical scanning with a 80cm travel, a large source-detector-distance range for phase contrast imaging, and a tomosynthesis mode through rotation of the detector.

CONCLUSIONS

A new flexible micro-CT scanner has been taken into operation at UGCT which is ideally suited for research on new tomography methods and its applications.

Index Terms— X-ray computed tomography; Tomographic reconstruction;